

PATENT ABSTRACTS OF JAPAN

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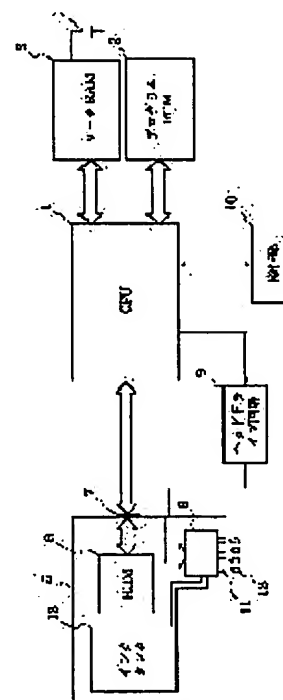
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(54) IMAGE RECORDING APPARATUS

(57)Abstract:

PURPOSE: To facilitate the setting and changing of control parameters or the like with a simple constitution by mounting a detachable information setting means equipped with a storage means in which specified information other than those relating to characteristic of its own is stored.

CONSTITUTION: With a power source switch turned on, an ID stored in a ROM in a cartridge is read out after initialization is applied to a register in a CPU 1 and to a part of a work RAM 3. The data in the memory in the cartridge are stored in the work RAM 3 in accordance with a format preset according to the ID. After that, operation proceeds to recording required by a user. On this occasion, the recording operation does not start if a cartridge mounted to the recording apparatus is not a normal ink jet head cartridge in which the ID is '0'. Therefore, control of the recording apparatus, making of various settings and changes of programs can be executed easily by making access to memories in a dummy head cartridge through a head interface serving for making access to memories in the ink jet head cartridge.



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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
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- 3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] Said information stored in said 1st storage means by equipping with the record means equipped with the 1st storage means which stored the information which can detach and attach freely and starts an own property Read-out, In the image recording equipment which rationalizes the operating condition of said record means based on the read information Image-recording equipment characterized by to read said predetermined information stored in said 2nd storage means by changing and equipping said record means with the information setting means equipped with the 2nd storage means which stored different predetermined information from the information concerning said property, and to store in the storage means in said equipment.

[Claim 2] Said record means and said information setting means are image recording equipment according to claim 1 characterized by being the same configuration.

[Claim 3] Image recording equipment according to claim 1 characterized by being the information which requires said predetermined information for the environment where said equipment is used.

[Claim 4] Image recording equipment according to claim 1 characterized by said predetermined information being the information which shows a recording mode.

[Claim 5] Image recording equipment according to claim 1 characterized by said predetermined information being the program for control of said equipment.

[Claim 6] Said record means is image recording equipment according to claim 1 characterized by breathing out ink from a delivery using the energy generated from a regurgitation energy generation component, and recording an image.

[Claim 7] Said regurgitation energy generation component is image recording equipment according to claim 6 characterized by generating heat energy, making a change of state occur in ink with said heat energy, making ink breathe out from a delivery based on said change of state, and forming a flight-drop.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the image recording equipment which records an image on record material using the record means which can be detached and attached freely.

[0002]

[Description of the Prior Art] The recording device of the ink jet method which records an image using the ink jet recording head of the cartridge-type which can be detached and attached freely

conventionally is known.

[0003] In such an ink jet type recording device, it is constraint of the process tolerance of two or more nozzles which constitute the ink discharge part, dispersion of the semi-conductor sensor for ink heating heater temperature detection, etc., and it is difficult to obtain the regurgitation of uniform ink from each nozzle. For this reason, it had in the cartridge the memory (ROM) which stored the correction value data (head shading data) for amending the regurgitation property for every correction value of the temperature sensor for every cartridge, or nozzle, the recording apparatus read these data from the head in advance of record, and you were making it reflected in regurgitation control with a cartridge-type ink jet head.

[0004]

[Problem(s) to be Solved by the Invention] However, even if it is the head which performed such regurgitation amendment, in order to influence ink itself of ambient temperature, humidity, an atmospheric pressure, etc., the fault referred to as being unable to perform record stabilized only in the above-mentioned amendment had arisen. Although it is possible as this solution means to equip equipment with sensors, such as temperature, humidity, and an atmospheric pressure, with equipment cheap at the point of pulling up the cost of a recording device, adoption is difficult.

[0005] Moreover, when using the same equipment with which a means avoid the complicatedness which sets up a favorite setup of a user each time when a recording apparatus is the color copying machine which needs to set up what requires various setup of a user, for example, record concentration, color balance, record number of sheets, and a record dimension is demanded by two or more users, as for especially each user, it is desirable that a favorite setup of it can be set as equipment simple.

[0006] Moreover, the case where he wants to update or change the control program of equipment itself may arise. For example, since the control program of equipment is usually stored in ROM when it is necessary to change into modification of an ink component with a regurgitation control algorithm, modification of the above-mentioned control program will be obliged to exchange of the program ROM of equipment. Since it has equipped with this program ROM in the equipment box, extraordinary time and effort is needed for exchange. Moreover, with the cartridge-type ink jet head, since a user can exchange cartridges freely, exchange of Program ROM is unreal to whenever [the], and the alternative control program modification means is needed for it.

[0007] This invention was made in view of the point describing above, and the place made into the purpose is to offer the image recording equipment which a setup of the parameter for control etc. is performed and can make a change etc. with an easy configuration.

[0008]

[Example] The example of this invention is explained to a detail with reference to a drawing below.

[0009] Drawing 1 is a block diagram showing the control section of an ink jet mold recording apparatus and the relation of a cartridge-type ink jet head which are one example of this invention. One in drawing is CPU and controls each part of equipment according to the program stored in the program ROM 2 in which the program for control was stored. 3 is the object for an operation, an object for data storage, and RAM for program storing, and the contents are held by the backup cell 4. 5 is an ink jet head cartlidge, and it has ROM which stored the head ID later mentioned in a cartridge, and various data, and connects with the body of a recording device through the head connector 7, and it is accessed from CPU1. In addition, the appearance of an ink jet head cartlidge is shown in drawing 8. 8 is the ink regurgitation heater section and has the structure of making a change of state occurring in the ink supplied from the ink tank 13, having in it, and making an ink droplet 12 breathing out, by making air bubbles generate in a nozzle 11

by the regurgitation pulse from the head drive circuit 9. Moreover, 10 is the control unit equipped with the key group for inputting various parameters etc., and various drops.

[0010] In this example, by acting as powering on in the condition of having equipped with the ink jet head cartlidge 5, the various data in which the property of a self-head is shown are read from ROM6, and it is used for various amendments.

[0011] Moreover, it has the composition that environmental data, the data for a recording-mode setup, the program for subroutine modification, etc. are read from ROM60 through the head connector 70, by changing to this ink jet head cartlidge 5, and acting as powering on in the condition of having equipped with the **** dummy head cartridge 50 shown in drawing 9 . Although this dummy head cartridge 50 has the same appearance configuration as the ink jet head cartlidge 5, it carries only ROM without the ink tank for record, and an ink regurgitation device.

[0012] In ROM of each cartridge, Head ID is stored for discernment of this ink jet head cartlidge and a dummy head cartridge.

[0013] Next, recognition of Head ID is explained. Drawing 2 is the list of the classification of a head which Head ID expresses. 256 sorts from 0 to 255 can set up Head ID. In this example, 0 shows the usual ink jet head cartlidge, and the dummy head cartridge is allotted after [all] one. That is, ID is assigned by the contents of the memory in which it also has a dummy head cartridge.

[0014] Drawing 3 is drawing showing mapping of the memory which it usually has also with the ink jet head or the dummy head. According to this drawing, ID is stored in the lowest address of memory.

[0015] ID shows memory mapping of the usual ink jet head cartlidge of "0" to drawing 4 .

[0016] In the memory in the usual ink jet head cartlidge of "0", the head shading data for amendment of the correction value of a thermo sensor and the discharge quantity of an ink regurgitation nozzle are stored in everything but ID for ID. The correction value of a temperature sensor is used for the temperature control of a heater which heats ink, and head shading data are used as correction value for equalizing the discharge quantity for every nozzle.

[0017] Now, a recording device reads ID of the start address of the memory in a head after powering on, and a head recognizes that it is the usual ink jet head. Furthermore, according to ID and the memory map conversion table (un-illustrating) which are beforehand stored in the program OM of a control unit, the contents of the memory in a head are read if needed, and it stores in the predetermined address of the work piece RAM 3 in a control unit. When [whose ID is "0"] it is usually a head, 128 BAIDO is secured on RAM3 as 1 byte and head shading data as an amount of sensor amendments. A recording apparatus reads head shading data for every powering on, and stores them in a work piece RAM 3.

[0018] ID shows memory mapping of the dummy head cartridge for an environmental data setup of "1" to drawing 5 . The data showing the temperature requirement of the environment where the recording apparatus itself [other than ID] is used for ID in the memory of the head cartlidge of "1", a humidity requirement, and an atmospheric pressure are stored. Discharge quantity will change with the temperature for which the ink used for an ink jet head, an ink heating heater, the diameter of a nozzle, etc. are used, humidity, and atmospheric pressures. Then, control is changed so that these conditions may be set as a recording device and the regurgitation with any proper operating environments may be made.

[0019] Since the operating environment of equipment needs to be based neither on a head nor a recording device but a user needs to set it up, not an ink head but a dummy head cartridge with the data for a setup of dedication is usually used. If this ID recognizes the data head for configuration of "1", a recording apparatus reads the data showing an environmental temperature

requirement, a humidity requirement, and an atmospheric pressure from the memory in a cartridge, and stores them in the predetermined address of a work piece RAM 3. Since the contents of the work piece RAM 3 are backed up by the cell 4, the data showing the temperature requirement of the environment in these work pieces RAM 3, a humidity requirement, and an atmospheric pressure continue being held until they equip equipment with another data head for configuration.

[0020] ID shows mapping of the memory in the dummy head cartridge for mode setting of "2" to drawing 6. The various set points with ID for [the set points] the record other than ID in the memory of the head of "2" are stored, and the contents set up in the control unit of a recording device are stored. That is, the equipment user sets a favorite setup as the memory in the dummy head cartridge for mode setting, and the time and effort set up by the control unit 10 can be saved by equipping a recording device. When the data set up by this dummy head cartridge for mode setting exist on a work piece RMA3 in advance of record, a recording apparatus makes a setup of a control unit 10 disregard or an invalid, and records according to these data. Moreover, when a user wants to perform a setup by the control unit, the setting data based on the dummy head cartridge for mode setting can be made into an invalid in the reset key on a control unit 10 (un-illustrating).

[0021] ID shows memory mapping of the dummy head cartridge for subroutine modification of "3" to drawing 7. The total byte count of the alternative program of some subroutines of the control program with which ID is stored in the program ROM 2 in a recording apparatus other than ID in the memory of the dummy head cartridge of "3", and this program is stored. ID will secure the area for a total byte count to it on a work piece RAM 3, if a recording apparatus is equipped with the dummy head cartridge of "3", and the alternative program read from ROM in a cartridge is stored in this area. It does not control according to the substituted program which furthermore suited on the program ROM 2 on the occasion of record actuation, but controls according to an alternative program.

[0022] According to various kinds of cartridges, the recording apparatus is performing reflection to the data readout from the memory in a cartridge, and control as mentioned above.

[0023] The flow of the recording device behind powering on of operation is shown in drawing 10. After powering on reads ID of ROM in a cartridge, after initializing the register of CPU1, and some work pieces RAM 3 (step S1). The data of the memory in a cartridge are stored in a work piece RAM 3 according to the format beforehand defined according to ID (step S2). Then, record actuation according to a demand of a user is performed (step S3). Since record actuation cannot be performed when ID of the cartridge with which the recording apparatus was equipped here is not the usual ink jet head cartlidge of "0", record actuation is not started.

[0024] Thus, from the head interface which accesses the memory in an ink jet head cartlidge, by accessing the memory in a dummy head cartridge, easily, the control approach of a recording device and various setup are performed, and a program change etc. can be made.

[0025] In addition, although this example explained the thing of the method which carries out the regurgitation of the ink also in an ink jet recording method using the bubble generated with heat energy, it may not be limited to this and you may be the thing of a piezo method.

[0026] In addition, about the typical configuration and typical principle of a method which carry out the regurgitation of the ink droplet using the heat energy in this example, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is desirable. Although this method is applicable to both the so-called mold on demand and a continuous system On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the case of the mold on demand By impressing at least one driving signal which

gives the rapid temperature rise which supports recording information and exceeds nucleate boiling. Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a recording head is made to produce film boiling and the air bubbles in the liquid (ink) corresponding to this driving signal can be formed by one to one as a result, it is effective. A liquid (ink) is made to breathe out through opening for regurgitation by growth of these air bubbles, and contraction, and at least one drop is formed. If this driving signal is made into the shape of a pulse form, since growth contraction of air bubbles will be performed appropriately instantly, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of the shape of this pulse form, what is indicated by the U.S. Pat. No. 4463359 specification and the 4345262 specification is suitable. In addition, if the conditions indicated by the U.S. Pat. No. 4313124 specification of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.

[0027] As a configuration of a recording head, the configuration using the U.S. Pat. No. 4558333 specification and U.S. Pat. No. 4459600 specification which indicate the configuration arranged to the field to which the heat operation section other than the combination configuration (a straight-line-like liquid flow channel or right-angle liquid flow channel) of a delivery which is indicated by each above-mentioned specification, a liquid route, and an electric thermal-conversion object is crooked is also included in this invention. In addition, the effectiveness of this invention is effective also as a configuration based on JP,59-138461,A which indicates the configuration whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the configuration which uses a common slit as the discharge part of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to a discharge part. Namely, no matter the gestalt of a recording head may be what thing, it is because it can record efficiently certainly.

[0028] Furthermore, it is effectively applicable also to the recording head of the full line type which has the die length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, the configuration which fills the die length with the combination of two or more recording heads, or the configuration as one recording head formed in one is good.

[0029] Moreover, although only one piece was prepared also about the class thru/or the number of a recording head carried, for example corresponding to monochromatic ink, corresponding to two or more ink which differs in others and record color or concentration, more than one may be prepared the number of pieces.

[0030]

[Effect of the Invention] Since this predetermined information is read in equipment by equipping with the information setting means equipped with the storage means which stored predetermined information which is different from the information which changes to the record means equipped with the storage means which stored the information concerning the property which can detach and attach freely and self has, and starts said property as mentioned above according to this invention, it becomes possible to perform various setup easily.

TECHNICAL FIELD

[Industrial Application] This invention relates to the image recording equipment which records an image on record material using the record means which can be detached and attached freely.

PRIOR ART

[Description of the Prior Art] The recording device of the ink jet method which records an image using the ink jet recording head of the cartridge-type which can be detached and attached freely conventionally is known.

[0003] In such an ink jet type recording device, it is constraint of the process tolerance of two or more nozzles which constitute the ink discharge part, dispersion of the semi-conductor sensor for ink heating heater temperature detection, etc., and it is difficult to obtain the regurgitation of uniform ink from each nozzle. For this reason, it had in the cartridge the memory (ROM) which stored the correction value data (head shading data) for amending the regurgitation property for every correction value of the temperature sensor for every cartridge, or nozzle, the recording apparatus read these data from the head in advance of record, and you were making it reflected in regurgitation control with a cartridge-type ink jet head.

EFFECT OF THE INVENTION

[Effect of the Invention] Since this predetermined information is read in equipment by equipping with the information setting means equipped with the storage means which stored predetermined information which is different from the information which changes to the record means equipped with the storage means which stored the information concerning the property which can detach and attach freely and self has, and starts said property as mentioned above according to this invention, it becomes possible to perform various setup easily.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, even if it is the head which performed such regurgitation amendment, in order to influence ink itself of ambient temperature, humidity, an atmospheric pressure, etc., the fault referred to as being unable to perform record stabilized only in the above-mentioned amendment had arisen. Although it is possible as this solution means to equip equipment with sensors, such as temperature, humidity, and an atmospheric pressure, with equipment cheap at the point of pulling up the cost of a recording device, adoption is difficult.

[0005] Moreover, when using the same equipment with which a means avoid the complicatedness which sets up a favorite setup of a user each time when a recording apparatus is the color copying machine which needs to set up what requires various setup of a user, for example, record concentration, color balance, record number of sheets, and a record dimension is demanded by two or more users, as for especially each user, it is desirable that a favorite setup of it can be set as equipment simple.

[0006] Moreover, the case where he wants to update or change the control program of equipment itself may arise. For example, since the control program of equipment is usually stored in ROM when it is necessary to change into modification of an ink component with a regurgitation control algorithm, modification of the above-mentioned control program will be obliged to exchange of the program ROM of equipment. Since it has equipped with this program ROM in the equipment box, extraordinary time and effort is needed for exchange. Moreover, with the cartridge-type ink jet head, since a user can exchange cartridges freely, exchange of Program ROM is unreal to whenever [the], and the alternative control program modification means is needed for it.

[0007] This invention was made in view of the point describing above, and the place made into the purpose is to offer the image recording equipment which a setup of the parameter for control etc. is performed and can make a change etc. with an easy configuration.

EXAMPLE

[Example] The example of this invention is explained to a detail with reference to a drawing below.

[0009] Drawing 1 is a block diagram showing the control section of an ink jet mold recording apparatus and the relation of a cartridge-type ink jet head which are one example of this invention. One in drawing is CPU and controls each part of equipment according to the program stored in the program ROM 2 in which the program for control was stored. 3 is the object for an operation, an object for data storage, and RAM for program storing, and the contents are held by the backup cell 4. 5 is an ink jet head cartlidge, and it has ROM which stored the head ID later mentioned in a cartridge, and various data, and connects with the body of a recording device through the head connector 7, and it is accessed from CPU1. In addition, the appearance of an ink jet head cartlidge is shown in drawing 8. 8 is the ink regurgitation heater section and has the structure of making a change of state occurring in the ink supplied from the ink tank 13, having in it, and making an ink droplet 12 breathing out, by making air bubbles generate in a nozzle 11 by the regurgitation pulse from the head drive circuit 9. Moreover, 10 is the control unit equipped with the key group for inputting various parameters etc., and various drops.

[0010] In this example, by acting as powering on in the condition of having equipped with the ink jet head cartlidge 5, the various data in which the property of a self-head is shown are read from ROM6, and it is used for various amendments.

[0011] Moreover, it has the composition that environmental data, the data for a recording-mode setup, the program for subroutine modification, etc. are read from ROM60 through the head connector 70, by changing to this ink jet head cartlidge 5, and acting as powering on in the condition of having equipped with the **** dummy head cartridge 50 shown in drawing 9. Although this dummy head cartridge 50 has the same appearance configuration as the ink jet head cartlidge 5, it carries only ROM without the ink tank for record, and an ink regurgitation device.

[0012] In ROM of each cartridge, Head ID is stored for discernment of this ink jet head cartlidge and a dummy head cartridge.

[0013] Next, recognition of Head ID is explained. Drawing 2 is the list of the classification of a head which Head ID expresses. 256 sorts from 0 to 255 can set up Head ID. In this example, 0 shows the usual ink jet head cartlidge, and the dummy head cartridge is allotted after [all] one. That is, ID is assigned by the contents of the memory in which it also has a dummy head cartridge.

[0014] Drawing 3 is drawing showing mapping of the memory which it usually has also with the ink jet head or the dummy head. According to this drawing, ID is stored in the lowest address of memory.

[0015] ID shows memory mapping of the usual ink jet head cartlidge of "0" to drawing 4.

[0016] In the memory in the usual ink jet head cartlidge of "0", the head shading data for amendment of the correction value of a thermo sensor and the discharge quantity of an ink regurgitation nozzle are stored in everything but ID for ID. The correction value of a temperature sensor is used for the temperature control of a heater which heats ink, and head shading data are used as correction value for equalizing the discharge quantity for every nozzle.

[0017] Now, a recording device reads ID of the start address of the memory in a head after powering on, and a head recognizes that it is the usual ink jet head. Furthermore, according to ID and the memory map conversion table (un-illustrating) which are beforehand stored in the program OM of a control unit, the contents of the memory in a head are read if needed, and it

stores in the predetermined address of the work piece RAM 3 in a control unit. When [whose ID is "0"] it is usually a head, 128 BAIDO is secured on RAM3 as 1 byte and head shading data as an amount of sensor amendments. A recording apparatus reads head shading data for every powering on, and stores them in a work piece RAM 3.

[0018] ID shows memory mapping of the dummy head cartridge for an environmental data setup of "1" to drawing 5 . The data showing the temperature requirement of the environment where the recording apparatus itself [other than ID] is used for ID in the memory of the head cartridge of "1", a humidity requirement, and an atmospheric pressure are stored. Discharge quantity will change with the temperature for which the ink used for an ink jet head, an ink heating heater, the diameter of a nozzle, etc. are used, humidity, and atmospheric pressures. Then, control is changed so that these conditions may be set as a recording device and the regurgitation with any proper operating environments may be made.

[0019] Since the operating environment of equipment needs to be based neither on a head nor a recording device but a user needs to set it up, not an ink head but a dummy head cartridge with the data for a setup of dedication is usually used. If this ID recognizes the data head for configuration of "1", a recording apparatus reads the data showing an environmental temperature requirement, a humidity requirement, and an atmospheric pressure from the memory in a cartridge, and stores them in the predetermined address of a work piece RAM 3. Since the contents of the work piece RAM 3 are backed up by the cell 4, the data showing the temperature requirement of the environment in these work pieces RAM 3, a humidity requirement, and an atmospheric pressure continue being held until they equip equipment with another data head for configuration.

[0020] ID shows mapping of the memory in the dummy head cartridge for mode setting of "2" to drawing 6 . The various set points with ID for [the set points] the record other than ID in the memory of the head of "2" are stored, and the contents set up in the control unit of a recording device are stored. That is, the equipment user sets a favorite setup as the memory in the dummy head cartridge for mode setting, and the time and effort set up by the control unit 10 can be saved by equipping a recording device. When the data set up by this dummy head cartridge for mode setting exist on a work piece RMA3 in advance of record, a recording apparatus makes a setup of a control unit 10 disregard or an invalid, and records according to these data. Moreover, when a user wants to perform a setup by the control unit, the setting data based on the dummy head cartridge for mode setting can be made into an invalid in the reset key on a control unit 10 (un-illustrating).

[0021] ID shows memory mapping of the dummy head cartridge for subroutine modification of "3" to drawing 7 . The total byte count of the alternative program of some subroutines of the control program with which ID is stored in the program ROM 2 in a recording apparatus other than ID in the memory of the dummy head cartridge of "3", and this program is stored. ID will secure the area for a total byte count to it on a work piece RAM 3, if a recording apparatus is equipped with the dummy head cartridge of "3", and the alternative program read from ROM in a cartridge is stored in this area. It does not control according to the substituted program which furthermore suited on the program ROM 2 on the occasion of record actuation, but controls according to an alternative program.

[0022] According to various kinds of cartridges, the recording apparatus is performing reflection to the data readout from the memory in a cartridge, and control as mentioned above.

[0023] The flow of the recording device behind powering on of operation is shown in drawing 10 . After powering on reads ID of ROM in a cartridge, after initializing the register of CPU1, and some work pieces RAM 3 (step S1). The data of the memory in a cartridge are stored in a work piece RAM 3 according to the format beforehand defined according to ID (step S2). Then, record

actuation according to a demand of a user is performed (step S3). Since record actuation cannot be performed when ID of the cartridge with which the recording apparatus was equipped here is not the usual ink jet head cartlidge of "0", record actuation is not started.

[0024] Thus, from the head interface which accesses the memory in an ink jet head cartlidge, by accessing the memory in a dummy head cartridge, easily, the control approach of a recording device and various setup are performed, and a program change etc. can be made.

[0025] In addition, although this example explained the thing of the method which carries out the regurgitation of the ink also in an ink jet recording method using the bubble generated with heat energy, it may not be limited to this and you may be the thing of a piezo method.

[0026] In addition, about the typical configuration and typical principle of a method which carry out the regurgitation of the ink droplet using the heat energy in this example, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is desirable. Although this method is applicable to both the so-called mold on demand and a continuous system On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the case of the mold on demand By impressing at least one driving signal which gives the rapid temperature rise which supports recording information and exceeds nucleate boiling Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a recording head is made to produce film boiling and the air bubbles in the liquid (ink) corresponding to this driving signal can be formed by one to one as a result, it is effective. A liquid (ink) is made to breathe out through opening for regurgitation by growth of these air bubbles, and contraction, and at least one drop is formed. If this driving signal is made into the shape of a pulse form, since growth contraction of air bubbles will be performed appropriately instancy, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of the shape of this pulse form, what is indicated by the U.S. Pat. No. 4463359 specification and the 4345262 specification is suitable. In addition, if the conditions indicated by the U.S. Pat. No. 4313124 specification of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.

[0027] As a configuration of a recording head, the configuration using the U.S. Pat. No. 4558333 specification and U.S. Pat. No. 4459600 specification which indicate the configuration arranged to the field to which the heat operation section other than the combination configuration (a straight-line-like liquid flow channel or right-angle liquid flow channel) of a delivery which is indicated by each above-mentioned specification, a liquid route, and an electric thermal-conversion object is crooked is also included in this invention. In addition, the effectiveness of this invention is effective also as a configuration based on JP,59-138461,A which indicates the configuration whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the configuration which uses a common slit as the discharge part of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to a discharge part. Namely, no matter the gestalt of a recording head may be what thing, it is because it can record efficiently certainly.

[0028] Furthermore, it is effectively applicable also to the recording head of the full line type which has the die length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, the configuration which fills the die length with the combination of two or more recording heads, or the configuration as one recording head formed in one is good.

[0029] Moreover, although only one piece was prepared also about the class thru/or the number of a recording head carried, for example corresponding to monochromatic ink, corresponding to

two or more ink which differs in an others and record color or concentration, more than one may be prepared the number of pieces.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the recording head of an ink jet recording apparatus and the relation of a control section which are one example of this invention.

[Drawing 2] It is the correspondence Fig. of ID of a head cartlidge, and the classification of a head cartlidge.

[Drawing 3] It is drawing showing mapping of the memory in a head cartlidge.

[Drawing 4] It is drawing showing mapping of the memory in an ink jet head cartlidge.

[Drawing 5] It is drawing showing mapping of the memory in the dummy head cartridge for an environmental data setup.

[Drawing 6] It is drawing showing mapping of the memory in the dummy head cartridge for mode setting.

[Drawing 7] It is drawing showing mapping of the memory in the dummy head cartridge for subroutine modification.

[Drawing 8] It is the sketch of an ink jet head cartlidge.

[Drawing 9] It is the sketch of a dummy head cartridge.

[Drawing 10] It is the flow Fig. of a recording device of operation.

[Description of Notations]

1 CPU

2 Program ROM

3 Work Piece RAM

5 Ink Jet Head Cartlidge

6 ROM

50 Dummy Head Cartridge

60 ROM

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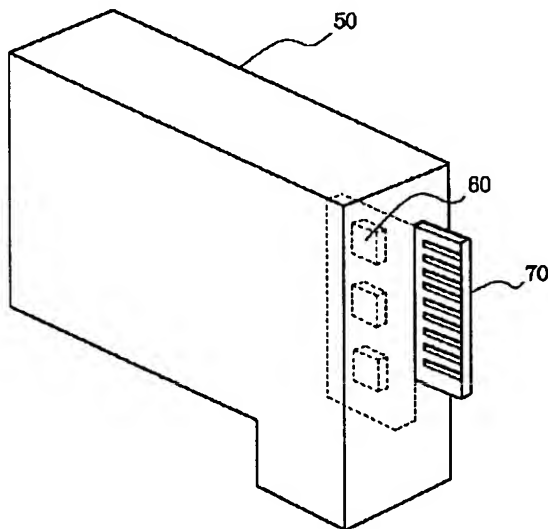
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(54) 【発明の名称】 画像記録装置

(57) 【要約】

【目的】 簡単な構成で制御用パラメータ等の設定、変更等を可能にすること。

【構成】 着脱自在で且つ自身の特性に係る情報を格納した記憶手段を備えた記録ヘッドカートリッジを本体に装着することにより、この情報が本体に読込まれ、この情報に基づいて記録条件の補正等が行われる。又、この記録ヘッドカートリッジに替えて、前記特性に係る情報とは異なる制御用のパラメータ或は制御プログラム等を格納した記憶手段を備えたダミーヘッドカートリッジを本体に装着することにより、この制御用パラメータ、制御プログラムが本体内に読込まれ、記憶される。これにより、例えば使用環境条件、記録モードの設定、変更或はサーブルーチンの変更等が特別な機構を本体側に設けることなく可能になる。



【特許請求の範囲】

【請求項1】 着脱自在で且つ自身の特性に係る情報を格納した第1記憶手段を備えた記録手段を装着することにより前記第1記憶手段に格納された前記情報を読み出し、読み出した情報に基づいて前記記録手段の動作条件の適正化を行う画像記録装置において、

前記特性に係る情報とは異なる所定の情報を格納した第2記憶手段を備えた情報設定手段を前記記録手段に替えて装着することにより前記第2記憶手段に格納された前記所定の情報を読み出して前記装置内の記憶手段に格納することを特徴とする画像記録装置。

【請求項2】 前記記録手段と前記情報設定手段は同一形状であることを特徴とする請求項1に記載の画像記録装置。

【請求項3】 前記所定の情報が前記装置の使用される環境に係る情報であることを特徴とする請求項1に記載の画像記録装置。

【請求項4】 前記所定の情報が記録モードを示す情報であることを特徴とする請求項1に記載の画像記録装置。

【請求項5】 前記所定の情報が前記装置の制御用プログラムであることを特徴とする請求項1に記載の画像記録装置。

【請求項6】 前記記録手段は吐出エネルギー発生素子から発生するエネルギーを利用してインクを吐出口から吐出して画像を記録することを特徴とする請求項1に記載の画像記録装置。

【請求項7】 前記吐出エネルギー発生素子は熱エネルギーを発生するものであって前記熱エネルギーによりインクに状態変化を生起させ、前記状態変化に基づいてインクを吐出口から吐出させて飛翔的液滴を形成することを特徴とする請求項6に記載の画像記録装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は着脱自在な記録手段を用いて記録材上に画像を記録する画像記録装置に関する。

【0002】

【従来の技術】 従来着脱自在なカートリッジ式のインクジェット記録ヘッドを用いて画像を記録するインクジェット方式の記録装置が知られている。

【0003】 この様なインクジェット式記録装置においては、インク吐出部を構成している複数のノズルの加工精度、インク加熱ヒーター温度検知用半導体センサのばらつき等の制約で、各ノズルから均一なインクの吐出を得るのが困難である。このためカートリッジ式インクジェットヘッドではカートリッジ毎の温度センサの補正值や各ノズル毎の吐出特性を補正するための補正值データ（ヘッドシェーディングデータ）を格納したメモリ（ROM）をカートリッジ内に備え、記録装置が記録に先立ちこれらのデータをヘッドから読み出して吐出制御に反

映させていた。

【0004】

【発明が解決しようとする課題】 しかしながらこのような吐出補正を施したヘッドであってもインクそのものが周囲温度、湿度、気圧等の影響を受けるため、上記補正だけでは安定した記録が行えないと言う欠点が生じていた。この解決手段としては、温度、湿度、気圧等のセンサを装置に備えることが考えられるが、記録装置のコストを引き上げてしまう点で廉価な装置では採用困難である。

【0005】 又、記録装置が使用者にさまざまな設定を要求するもの、例えば記録濃度、色バランス、記録枚数、記録寸法を設定する必要があるカラー複写機の場合には、使用者の好みの設定を毎回設定する煩雑さを回避する手段が要求される同一装置を複数の使用者で使用する場合には特に各使用者は自分の好みの設定を装置に簡単に設定できることが望ましい。

【0006】 又、装置の制御プログラム自体を更新あるいは変更したい場合が生じることがある。例えば、吐出制御アルゴリズムをインク成分の変更に伴って変更する必要が生じた場合、通常装置の制御プログラムはROMに格納されているため、上記制御プログラムの変更は装置のプログラムROMの交換を余儀なくされてしまう。該プログラムROMは装置筐体内に装着してあるため交換には非常な手間が必要になる。またカートリッジ式インクジェットヘッドでは、使用者が自由にカートリッジを交換できるのでその度にプログラムROMの交換は非現実的であり、代わりの制御プログラム変更手段が必要とされている。

【0007】 本発明は上記点に鑑みてなされたもので、その目的とするところは、簡単な構成で制御用パラメータ等の設定、変更等を行うことが可能な画像記録装置を提供することにある。

【0008】

【実施例】 以下本発明の実施例を図面を参照して詳細に説明する。

【0009】 図1は本発明の一実施例であるインクジェット型記録装置の制御部とカートリッジ式インクジェットヘッドの関係を表したブロック図である。図中1はCPUであり、制御用プログラムが格納されたプログラムROM2に格納されているプログラムに従って装置各部を制御する。3は演算用、データ格納用、プログラム格納用RAMであり、バックアップ電池4によってその内容が保持されている。5はインクジェットヘッドカートリッジであり、カートリッジ内に後述するヘッドID及び各種データを格納したROMを備え、ヘッドコネクタ7を介して記録装置本体と接続され、CPU1からアクセスされる。尚、インクジェットヘッドカートリッジの外観を図8に示す。8はインク吐出ヒーター部であり、ヘッドドライブ回路9からの吐出パルスによってノズル

11内に気泡を生成させることにより、インクタンク13から供給されるインクに状態変化を生起させ、もってインク滴12を吐出させる構造になっている。又、10は各種パラメータ等を入力するためのキー群、各種表示器を備えた操作部である。

【0010】本実施例ではインクジェットヘッドカートリッジ5を装着した状態で電源投入することにより、ROM6から自ヘッドの特性を示す各種データが読出され、各種補正に用いられる。

【0011】又、このインクジェットヘッドカートリッジ5に替えて、図9に示す如きダミーヘッドカートリッジ50を装着した状態で電源投入することにより、ヘッドコネクタ70を介してROM60から環境データ、記録モード設定用データ、サブルーチン変更用プログラム等が読出される構成となっている。このダミーヘッドカートリッジ50は、インクジェットヘッドカートリッジ5と同じ外観形状を持つものであるが、記録用インクタンク、インク吐出機構を持たずROMだけを搭載したものである。

【0012】このインクジェットヘッドカートリッジとダミーヘッドカートリッジの識別のために各カートリッジのROM内にはヘッドIDが格納されている。

【0013】次にヘッドIDの認識について説明する。図2はヘッドIDが表すヘッドの種別の一覧である。ヘッドIDは0から255までの256種が設定可能である。本実施例では0が通常のインクジェットヘッドカートリッジを示し、1以降は全てダミーヘッドカートリッジに充てられている。すなわちダミーヘッドカートリッジもそれが持つメモリの内容によってIDが割り振られている。

【0014】図3は通常インクジェットヘッドでもダミーヘッドでも備えているメモリのマッピングを示す図である。同図によればメモリの最下位アドレスにIDが格納されている。

【0015】図4にIDが“0”の通常インクジェットヘッドカートリッジのメモリマッピングを示す。

【0016】IDが“0”の通常インクジェットヘッドカートリッジ内のメモリ内にはIDの他に、温度センサーの補正值、インク吐出ノズルの吐出量の補正のためのヘッドシェーディングデータが格納されている。温度センサーの補正值はインクを加熱するヒーターの温度調整に用いられ、ヘッドシェーディングデータはノズル毎の吐出量を均一化するための補正值として用いられている。

【0017】さて記録装置は電源投入後、ヘッド内メモリの先頭アドレスのIDを読み取り、ヘッドが通常のインクジェットヘッドであることを認識する。更に制御装置のプログラムROM内に予め格納されている、IDとメモリマップ対応表(不図示)に従いヘッド内メモリの内容を必要に応じて読みだし、制御装置内のワークRAM3の所定のアドレスに格納する。IDが“0”である通

常ヘッドの場合にはセンサ補正量として1バイト、ヘッドシェーディングデータとして128バイトがRAM3上に確保されている。記録装置は電源投入毎にヘッドシェーディングデータを読みだしワークRAM3に格納する。

【0018】図5にIDが“1”の環境データ設定用ダミーヘッドカートリッジのメモリマッピングを示す。IDが“1”のヘッドカートリッジのメモリ内にはIDの他に、記録装置自体が使用される環境の温度範囲、湿度範囲、気圧を表すデータが格納されている。インクジェットヘッドに使用されるインクとインク加熱ヒータ、ノズル径等は使用される温度、湿度、気圧によって吐出量が増減してしまう。そこでこれらの条件を記録装置に設定していかなる使用環境でも適正な吐出ができるように制御を変更するようにしてある。

【0019】装置の使用環境は、ヘッドや記録装置によらず使用者が設定する必要があるため通常インクヘッドではなく、専用の設定用データを持ったダミーヘッドカートリッジが使用される。記録装置はこのIDが“1”の環境設定用データヘッドを認識したら、環境の温度範囲、湿度範囲、気圧を表すデータをカートリッジ内メモリから読みだしてワークRAM3の所定アドレスに格納する。ワークRAM3の内容は電池4によってバックアップされているため、これらワークRAM3内の環境の温度範囲、湿度範囲、気圧を表すデータは別の環境設定用データヘッドを装置に装着するまでは保持され続ける。

【0020】図6にIDが“2”のモード設定用ダミーヘッドカートリッジ内のメモリのマッピングを示す。IDが“2”のヘッドのメモリ内にはIDの他に、記録の際の各種設定値が格納されており、記録装置の操作部にて設定される内容が格納されている。すなわち、装置使用者が好みの設定をモード設定用ダミーヘッドカートリッジ内のメモリに設定しておき、記録装置に装着することにより操作部10で設定する手間が省ける。記録装置は記録に先立ち、該モード設定用ダミーヘッドカートリッジで設定されたデータがワークRAM3上に存在する場合には、操作部10の設定を無視あるいは無効にして、該データに従って記録を行う。また使用者が操作部による設定を行いたい場合には、操作部10上のリセットキー(不図示)にてモード設定用ダミーヘッドカートリッジによる設定データを無効にすることができる。

【0021】図7にIDが“3”のサブルーチン変更用ダミーヘッドカートリッジのメモリマッピングを示す。IDが“3”のダミーヘッドカートリッジのメモリ内にはIDの他に、記録装置内のプログラムROM2に格納されている制御プログラムの一部のサブルーチンの代替プログラムと該プログラムのトータルバイト数が格納してある。記録装置にIDが“3”のダミーヘッドカートリッジが装着されたら、ワークRAM3上にトータル

バイト数分のエリアを確保し、カートリッジ内のROMから読みだした代替えプログラムを該エリアに格納する。さらに記録動作に際してはプログラムROM2上にあった被代替えプログラムに従って制御を行うのではなく、代替えプログラムに従って制御を行う。

【0022】以上のように各種のカートリッジに応じて記録装置はカートリッジ内のメモリからのデータ読みだしと制御への反映を行っている。

【0023】図10に電源投入後の記録装置の動作フローを示す。電源投入後は、CPU1のレジスタ、ワークRAM3の一部の初期化を行った後（ステップS1）、カートリッジ内のROMのIDの読み出しを行う。IDに応じて予め定めてあったフォーマットに従いカートリッジ内メモリのデータをワークRAM3に格納する（ステップS2）。その後、使用者の要求に応じた記録動作を行う（ステップS3）。ここで記録装置に装着されたカートリッジのIDが“0”の通常インクジェットヘッドカートリッジでない場合には記録動作ができないので記録動作には入らない。

【0024】この様にインクジェットヘッドカートリッジ内のメモリをアクセスするヘッドインターフェースから、ダミーヘッドカートリッジ内のメモリをアクセスすることにより、記録装置の制御方法、各種設定、プログラム変更等が容易に行える。

【0025】尚、本実施例では、インクジェット記録方式の中でも、熱エネルギーにより発生するバブルを使用してインクを吐出する方式のものについて説明したが、これに限定されるものではなく、ピエゾ方式のものであってもよい。

【0026】尚、本実施例における熱エネルギーを用いてインク滴を吐出する方式の代表的な構成や原理については、例えば、米国特許第4723129号明細書、同第4740796号明細書に開示されている基本的な原理を用いて行うものが好ましい。この方式は所謂オンデマンド型、コンティニユアス型のいずれにも適用可能であるが、特に、オンデマンド型の場合には、液体（インク）が保持されているシートや液路に対応して配置されている電気熱変換体に、記録情報に対応して核沸騰を越える急速な温度上昇を与える少なくとも1つの駆動信号を印加することによって、電気熱変換体に熱エネルギーを発生せしめ、記録ヘッドの熱作用面に膜沸騰を生じさせて、結果的にこの駆動信号に一对一で対応した液体（インク）内の気泡を形成できるので有効である。この気泡の成長、収縮により吐出用開口を介して液体（インク）を吐出させて、少なくとも1つの滴を形成する。この駆動信号をパルス形状とすると、即時適切に気泡の成長収縮が行われるので、特に応答性に優れた液体（インク）の吐出が達成でき、より好ましい。このパルス形状の駆動信号としては、米国特許第4463359号明細書、同第4345262号明細書に記載されているよ

うなものが適している。なお、上記熱作用面の温度上昇率に関する発明の米国特許第4313124号明細書に記載されている条件を採用すると、さらに優れた記録を行うことができる。

【0027】記録ヘッドの構成としては、上述の各明細書に開示されているような吐出口、液路、電気熱変換体の組合せ構成（直線状液流路または直角液流路）の他に熱作用部が屈曲する領域に配置されている構成を開示する米国特許第4558333号明細書、米国特許第4459600号明細書を用いた構成も本発明に含まれるものである。加えて、複数の電気熱変換体に対して、共通するスリットを電気熱変換体の吐出部とする構成を開示する特開昭59-123670号公報や熱エネルギーの圧力波を吸収する開孔を吐出部に対応させる構成を開示する特開昭59-138461号公報に基づいた構成としても本発明の効果は有効である。すなわち、記録ヘッドの形態がどのようなものであっても、記録を確実に効率よく行いうるからである。

【0028】さらに、記録装置が記録できる記録媒体の最大幅に対応した長さを有するフルラインタイプの記録ヘッドに対しても有効に適用できる。そのような記録ヘッドとしては、複数記録ヘッドの組合せによってその長さを満たす構成や、一体的に形成された1個の記録ヘッドとしての構成のいずれかでもよい。

【0029】また、搭載される記録ヘッドの種類ないし個数についても、例えば単色のインクに対応して1個のみが設けられたものの他、記録色や濃度を異にする複数のインクに対応して複数個数設けられるものであってもよい。

【0030】

【発明の効果】以上の様に本発明によれば、着脱自在で且つ自身の持つ特性に係る情報を格納した記憶手段を備えた記録手段に替えて、前記特性に係る情報とは異なる所定の情報を格納した記憶手段を備えた情報設定手段を装着することにより、この所定情報が装置内に読込まれるので、各種設定を容易に行うことが可能になる。

【図面の簡単な説明】

【図1】本発明の一実施例であるインクジェット記録装置の記録ヘッドと制御部の関係を示すブロック図である。

【図2】ヘッドカートリッジのIDとヘッドカートリッジの種類の対応図である。

【図3】ヘッドカートリッジ内メモリのマッピングを示す図である。

【図4】インクジェットヘッドカートリッジ内のメモリのマッピングを示す図である。

【図5】環境データ設定用ダミーヘッドカートリッジ内のメモリのマッピングを示す図である。

【図6】モード設定用ダミーヘッドカートリッジ内のメモリのマッピングを示す図である。

【図7】 サブルーチン変更用ダミーヘッドカートリッジ内のメモリのマッピングを示す図である。

【図8】 インクジェットヘッドカートリッジの見取り図である。

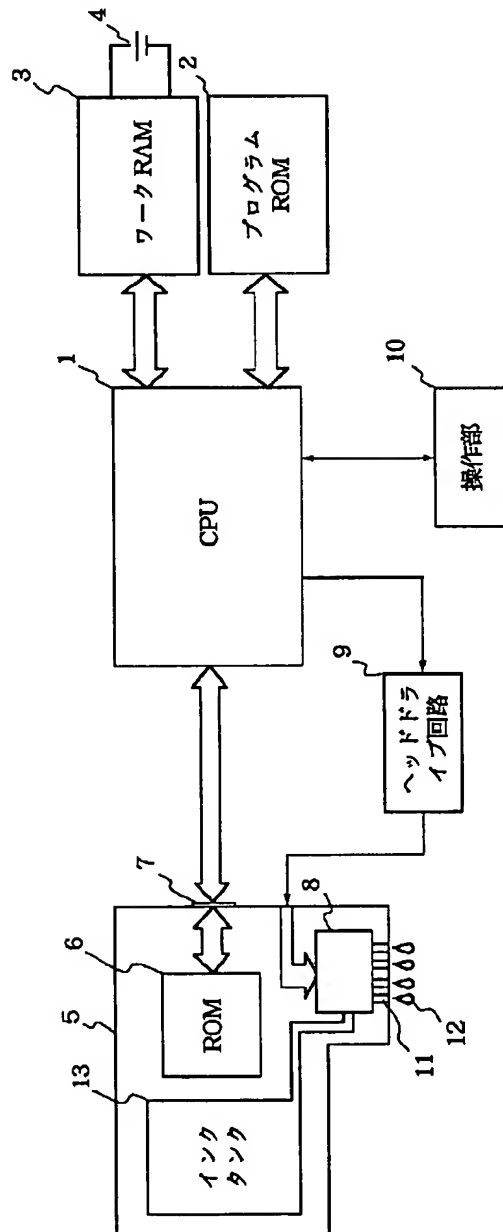
【図9】 ダミーヘッドカートリッジの見取り図である。

【図10】 記録装置の動作フロー図である。

【符号の説明】

- 1 CPU
- 2 プログラムROM
- 3 ワークRAM
- 5 インクジェットヘッドカートリッジ
- 6 ROM
- 50 ダミーヘッドカートリッジ
- 60 ROM

【図1】



【図2】

ID	ヘッドの種類
0	通常ヘッド
1	環境データ設定用データヘッド
2	モード設定用データヘッド
3	サブルーチン変更用プログラムヘッド
4	-----
⋮	⋮
255	-----

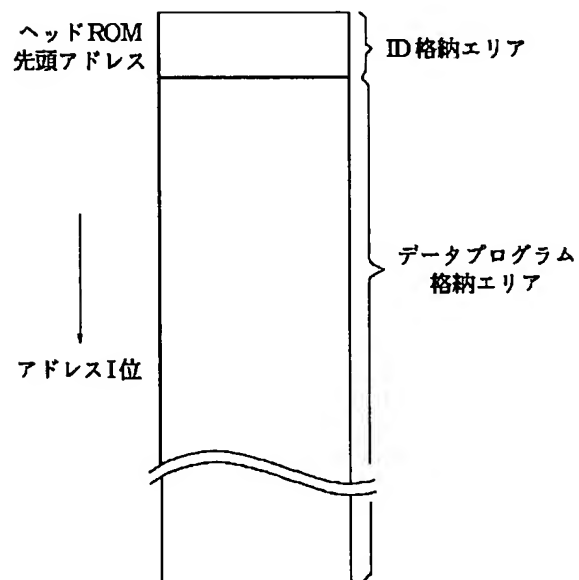
ダミーヘッド

ヘッドIDとヘッドの種類

【図4】

0000H	ID = 0
0001H	センサ補正值
0002H	ノズル0のヘッド シェーディングデータ
0003H	ノズル1のヘッド シェーディングデータ
	⋮
00081H	ノズル127のヘッド シェーディングデータ
	空き

【図3】



【図5】

ID = "1"
環境温度範囲 データ
環境温度範囲 データ
環境気圧データ
空き

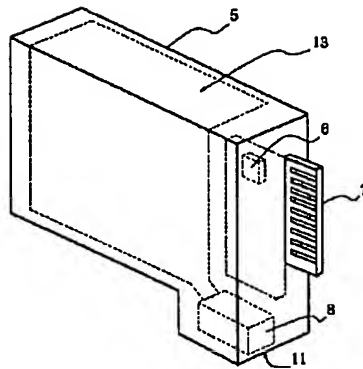
【図7】

ID = "3"
変更サブルーチン名
トータルバイト数
プログラム
空き

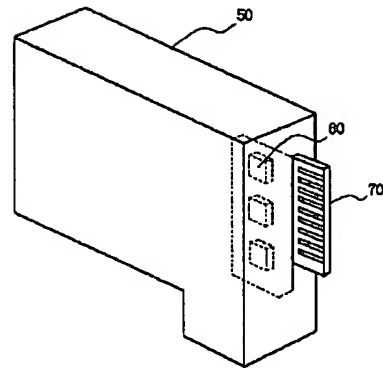
【図6】

ID = "2"
全体濃度レベル
C濃度レベル
M濃度レベル
Y濃度レベル
K濃度レベル
複写倍率
記録枚数
記録寸法縦
記録寸法横
空き

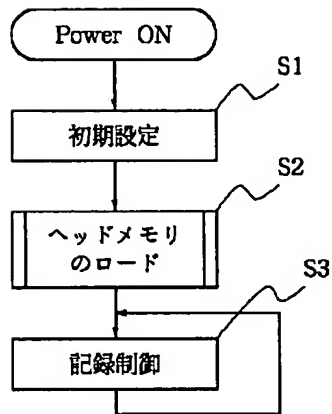
【図8】



【図9】



【図10】



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